

IN THE CLAIMS

1. (Previously presented) A fiber mat faced gypsum board made by
 - (1) contacting a gypsum slurry for forming a set gypsum core with
 - (2) a non-coated side of a pre-coated fiber mat, wherein the fiber mat has a thickness of between 0.02 and 0.045 inch and has a coating on a side opposite the non-coated side, said coating weighing about 30 to 100 pounds per 1000 square feet of mat and comprising a combination of (i) a mineral pigment, (ii) an organic binder and optionally (iii) an inorganic binder, the coating extending from a surface of said side opposite into said fiber mat a distance between about 30 and 50 percent of said thickness and having a microporosity, as measured by a modified Gurley method, of between 2 and 45 seconds, which allows air to flow through as gypsum penetrates the mat and water to evaporate through said pre-coated mat from the gypsum core during preparation of the board,
 - (3) wherein the contacting causes said gypsum slurry to penetrate into the non-coated side and through interstices of the fiber mat to fill said interstices with gypsum and form a bond between said gypsum and said coating, and
 - (4) allowing the gypsum slurry to harden to form said set gypsum core, wherein the set gypsum core in a region near the bond has at least 17 percent combined water.
2. (Original) The board of claim 1 wherein the organic binder is a hydrophobic, UV resistant polymer latex.
3. (Original) The board of claim 2 wherein said mat contains glass fibers nominally about 10 to 16 microns in diameter.
4. (Original) The board of claim 3 in which said mat, in the absence of said coating, has a basis weight of 1 to 3 pounds per 100 square feet.

5. (Original) The board of claim 1 having a gypsum core density of 40 to 55 pounds per cubic foot.

6. (Canceled).

7. (Previously presented) The board of claim 1 wherein, on a dry weight basis, the mineral pigment comprises from about 75 to 99 weight percent of the coating, the inorganic binder comprises from about 0 to 20 weight percent of the coating and the organic binder comprises from about 1 to 17 weight percent of the coating and the microporosity of the coating as measured by the modified Gurley method is between 5 and 20 seconds.

8. (Canceled).

9. (Previously presented) The board of claim 7 wherein, on a dry weight basis, the mineral pigment comprises from about 83 to 95 weight percent of the coating, the inorganic binder comprises from about 0 to 10 weight percent of the coating and the organic binder is a hydrophobic, UV resistant polymer latex binder and comprises from about 1 to 12 weight percent of the coating.

10. (Original) The board of claim 9 wherein said coating was applied to a surface of the fiber mat as an aqueous coating composition and dried to form said pre-coated mat.

11. (Original) The board of claim 10 wherein said aqueous coating composition includes about 0.1 to about 5 wt. % of one or more additives selected from the group consisting of a thickener, dispersant, colorant, defoaming agent and preservator.

12. (Canceled).

13. (Previously presented) The board of claim 10 wherein the set gypsum core contains a water-resistant additive in an amount of at least about 0.2 wt. %.

14. (Canceled).

15. (Previously presented) The board of claim 13 wherein said water resistant additive is selected from the group consisting of a wax emulsion, a wax-asphalt emulsion, poly(vinyl alcohol), a polysiloxane, a silicate and mixtures thereof.

16. (Previously presented) The board of claim 7 wherein the organic binder is a hydrophobic, UV resistant polymer latex adhesive binder and consists essentially of a (meth)acrylic or (meth)acrylate polymer or a (meth)acrylic or (meth)acrylate copolymer.

17. (Previously presented) The board of claim 16 wherein said pre-coated fiber mat consists essentially of glass fibers and wherein the set gypsum core of the fiber mat faced gypsum board is faced on an opposite side with another fibrous mat which consists essentially of a blend of glass fibers and synthetic fibers.

18-20. (Canceled).

21. (Previously presented) A fiber mat faced gypsum board made by:
contacting a gypsum slurry for forming a set gypsum core with a non-coated side of a pre-coated fiber mat,

wherein the fiber mat has a coating on a side opposite the non-coated side,
said coating weighing about 30 to 100 pounds per 1000 square feet of mat
and comprising a combination of
(i) a mineral pigment,
(ii) an organic binder and
optionally, (iii) an inorganic binder,
the coating penetrating from a surface of said side opposite into said fiber
mat to a depth of about 30 percent to about 50 percent of the thickness of the glass
fiber mat, and

having a microporosity, as measured by a modified Gurley method, of
between 2 and 45 seconds, which allows air to flow through as gypsum penetrates
the mat and water to evaporate through said pre-coated mat from the gypsum core
during preparation of the board,

wherein the contacting causes said gypsum slurry to penetrate into the non-
coated side and through interstices of the fiber mat to fill said interstices with gypsum
and form a bond between said gypsum and said coating, and
allowing the gypsum slurry to harden to form said set gypsum core, wherein the set
gypsum core in a region near the bond has at least 17 percent combined water.

22. (Previously presented) The fiber mat faced gypsum board of claim 21, wherein
the mineral pigment is limestone and the organic binder is an acrylic copolymer having a three-
minute Cobb value of 1.5 grams or below.

23. (Previously presented) The fiber mat faced gypsum board of claim 21, wherein
the coating penetration is within about 30 percent to about 50 percent of the thickness of the
glass fiber mat over at least 50 percent of the surface area across the entire mat.

24. (Previously presented) The fiber mat faced gypsum board of claim 21, wherein the coating penetration is within about 35 percent to about 50 percent of the thickness of the glass fiber mat over at least 75 percent of the surface area across the entire mat.

25. (Previously presented) The fiber mat faced gypsum board of claim 21, wherein the microporosity of the coating is about 2 to about 45 seconds over at least 50 percent of the surface area across the entire mat, wherein the microporosity as measured by a modified Gurley method.

26. (Previously presented) The fiber mat faced gypsum board of claim 21, wherein the microporosity of the coating is about 5 to about 20 seconds over at least 75 percent of the surface area of the entire mat, as measured by a modified Gurley method.

27. (Previously presented) The fiber mat faced gypsum board of claim 21, wherein the density of the core of the pre-coated fiber mat is within about 40 to about 55 pounds per cubic foot over at least 50 percent of the surface area of the entire mat.

28. (Previously presented) The fiber mat faced gypsum board of claim 21, wherein the pre-coated fiber mat is essentially liquid impermeable.

29. (Previously presented) The fiber mat faced gypsum board of claim 21, wherein a bond between the gypsum core and the mat facer of the fiber mat faced gypsum board has a tensile strength of about 16 pounds per square inch.

30-32. (Canceled)

33. (New) A gypsum board comprising:
a gypsum core;
a fiber mat comprising a first side and second side opposite the first side, the second side is bonded to the gypsum core, wherein the gypsum core in the region of the bond has at least 17 percent combined water; and
a coating penetrating the mat from the first side into the fiber mat to a depth of about 30 percent to about 50 percent of the thickness of the fiber mat, the coating comprises a mineral pigment and an organic binder, wherein the organic binder comprises at least about 1 percent and no more than 17 percent by weight and the mineral pigment has a particle size such that at least about 95 percent by weight of the mineral pigment particles pass through a 100 mesh wire screen, with about 75 percent of the particles by number being greater than 5 microns.

34. (New) The gypsum board of claim 33, wherein the fiber mat comprises glass fibers nominally about 10 to 16 microns in diameter and about one-quarter (1/4) to about one (1) inch in length, the fiber mat in the absence of the coating has a basis weight of 1 to 3 pounds per 100 square feet, and the fiber mat has a thickness from about 0.02 inch to about 0.045 inch.

35. (New) The gypsum board of claim 33, wherein the coating penetrates the mat about 35 percent to about 50%.

36. (New) The gypsum board of claim 33, wherein the coating weighs on a dry weight basis about 30 to 100 pounds per 1000 square feet of mat.

37. (New) The gypsum board of claim 36, where the coating has a microporosity, as measured by a modified Gurley method, of less than about 45 seconds.

38. (New) The gypsum board of claim 37, wherein the microporosity is less than about 20 seconds.

39. (New) The gypsum board of claim 38, wherein the microporosity is between 5 and 20 seconds.

40. (New) The gypsum board of Claim 1, wherein the coating has a viscosity between about 8,000 cps and 18,000 cps.

41. (New) The gypsum board of Claim 1, wherein the mineral pigment has a particle size such that at least about 95 percent by weight of the mineral pigment particles pass through a 100 mesh wire screen, with about 75 percent of the particles by number being greater than 5 microns.

42. (New) The gypsum board of claim 1, wherein the mineral pigment has a number average particle size of about 40 microns.